The Geology Of Oil Fields

An Interesting Comparison of California Producers With the Conditions Along the Foothills of the Sacramento Mountains in New Mexico.

A comparison of the stratagraphical and geological conditions in the proven oil fields of California and in the La Luz anticlines north a few miles of Alamogordo will prove of special interest right now while prospecting is going on at Camp City.

The accompanying plat No. 1 shows the folding and bending of the strata to the west of Kern lake, California, in what is known as the Sunset oil field, and its effect on the deposits of oil, gas and artesian water. A study of the chart, and the accompanying logs of wells Nos. 1 to 7 enables one to learn why there may be a gas well on one side of oil wells, and artesian water on the other, also why there may be very narrow belts of productive oil territory and also why artesian water may be struck by sinking on a hill, while the well sunk in the hollow proves dry, although sunk much deeper.

Kern River Field.

Stratigraphical conditions are the same in the Kern River field, and also the geology is the same, but in the Kern River the strata are lifted into a wide, low table anticline, and at all points between the two outside wells which give only water, oil wells may be sunk with a certainty of the depth necessary to get oil, the thickness of the oil bearing sand, and the amount of oil that may be drained before the well is started, consequently this is the investors' field because there is the minimum of risk.

The Sunset and Kern River fields are some fifteen miles apart; I have foreshortened the plain and lake lying between them in order to show the two fileds in the one chart.

(The gas, oil and water levels noted in the lower left hand corner, are for the particular strata of sandstone shown to carry these three elements, and does not relate to other strata of sandstone lower down which also might contain gas, oil and water.)

Torrey Canyon Field.

Plat No. 2 is of the Torrey Canyon oil field, about 100 miles south of the two fileds shown in plat 1; this is in Ventura county, California, and is a fine illustration of the upheaval of an anticline breaking the surface strata, later meteoric waters flowing along the break and washing out a canyon. In this case, when the canyon was washed down into the oil sands, the oil flowed out, the volatile oil and gasses passed off into the air, leaving the heavy oil and asphaltum in the bottom as a floor, which tended to stop further cutting.

Getting Away From the Seep.

By digging a shallow trench in the bottom of the canyon, two or three barrels of oil could be dipped up daily; this led a prominent California oil company to spend many thousands of dollars in sinking dry wells in the bottom of the canyon where oil indications were exceptionally good. The chart shows plainly why their money was wasted in sinking in the canyon, and why by climbing the hill five hundred feet, and getting back from the action of air, they now produce 30,000 barrels of oil monthly.

La Luz Anticlines and Fault.

Barely one-half mile east of the little village of La Luz, in Otero county, New Mexico, the strata at the lower left hand corner of chart 3 are exposed as shown. The La Luz canyon, cutting through the foothill, gives a splendid exposure of the entire bending of the upper rocks, which are limes, shales, conglomerates and sandstones, in which fossils of marine animal life are abundant, and appear to be of the upper carboniferous age, while the fossils found in the rocks of the oil fields of California are of the Tertiary age, but this is the only difference, which is apparent to the most scientific geologist only. This difference proves that the rocks of La Luz were deposited millions of years prior to those of the California oil fields.

About one and a quarter miles inside the canyon the La Luz river strikes the overthrust fault shown in the chart, which it follows for a half mile, and then is found to have cut through the anticline on the east side of the fault, the walls of the canyon here giving a good exposure of the bending strata also.

A Striking Landmark.

The overthrust fault shown in the chart is one of the most interesting of the geological features of this field. It is traceable on the surface for miles. Streams and canyons from the higher Sacramento mountains, when they strike this fault, invariably turn and follow the course of the fault for some distance.

To the east of La Luz, the anticline on the west side of the fault is much higher than that on the east side, but about two miles to the north of La Luz the anticline on the west of the fault has dipped into the San Augustine plain, and the one to the east of the fault has raised to some four hundred feet in height, and gradually growing lower toward the northwest, the outer edge of the foothills following the course of this fault for another dozen miles.

On the anticline to the east of this fault there are numerous exposures of gilsonite, asphaltum, shales and sandstones containing liquid oil and giving off gas, some of the cavities in the shale giving off gas so that it will burn for hours.

I know of but one oil seepage in the anticline to the west of the fault, but at this place the oil is seeping from the rocks for a distance of fifty yards and mixing with the dirt at the foot of the rocks forms a mud that is much softer the hotter the sun shines on it; this mud or oil gives none of the bitumen odors, and for that reason I think it probably a parafine oil.

There can be no question that this is an oil belt, that the oil is here. Indications are that it is as abundant as in California, but it will require the drill and some enterprise to prove just what fortunes are to be made along the line of this fault.

Logs of the Wells.

Plat No. 1.—Well No. 1 gives a log as follows: Starting the well about 1000 feet east of an exposure of sand (supposed to be oil bearing) in a ravine, the first 70 feet is in limestone.

2nd, Conglomerate,
3rd, Shale,
4th, Lime,
5th, Shale (heavy),
6th, Sandstone (strong gas pressure),
7th, Shale,
8th, Lime,
9th, Conglomerate 2200 feet deep, no signs of oil below 6th (sand).

Well No. 2.—Start well in hollow 800 feet east of No. 1 in conglomerate,

2nd, Shale,
3rd, Limestone,
4th, Shale (heavy),
5th, Oil sand 60 feet thick (good producer).

Well No. 3.—Start well 1100 feet east of No. 2 on hill, in lime and shale,

2nd, Conglomerate,
3rd, Shale,
4th, Lime,
5th, Shale (very heavy),
6th, Lime (light),
7th, Shale (heavy),
8th, Sandstone (water flows over top of casing) 2230 feet.

Well No. 4.—Start well 600 feet east of No. 3 on slope of hill in conglomerate,

2nd, Shale,
3rd, Lime,
4th, Shale,
5th, Sandstone (heavy gas pressure),
6th, Shale,
7th, Sandstone, 150 feet (oil flowing over casing) 1520 feet, (this well was later sunk deeper, turned to a water well, and the casing withdrawn, causing the ruin of several good producing oil wells, the pressure of water driving out the oil for long distance along the belt.)

Well No. 5—400 feet east of No. 4, in shallow ravine; start in conglomerate;

2nd, Shale,
3rd, Lime,
4th, Shale (heavy),
5th, Sand (heavy gas pressure),
6th, Shale,
7th, Lime,
8th, Conglomerate,
9th, Shale,
10th, Lime,
11th, Shale,
12th, Sandstone (dry) 2350 feet, no indications of oil.

Well No. 6.—1000 feet east of No. 5 on slope of hill, start in solid lime;

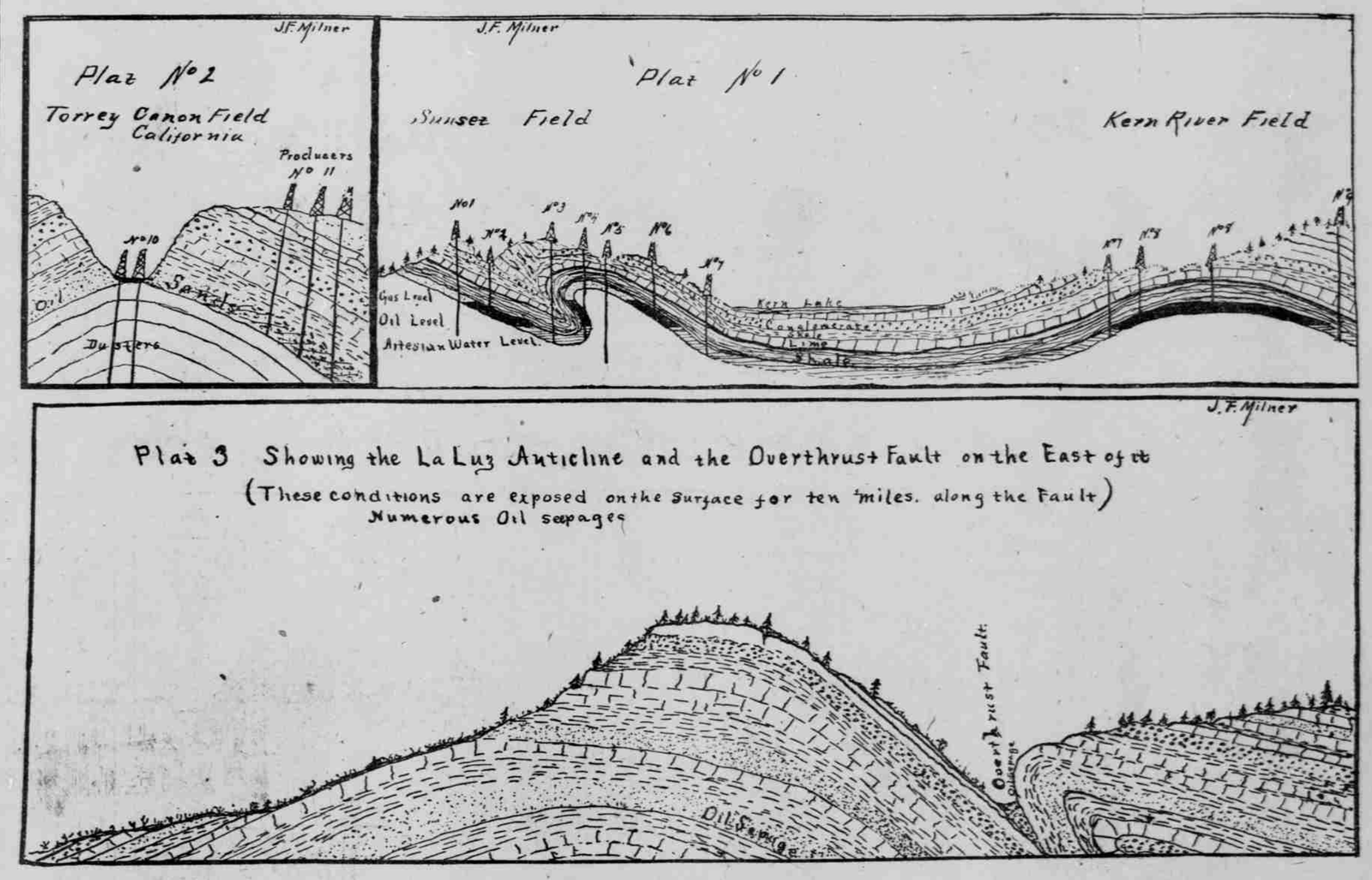
2nd, Conglomerate,
3rd, Shale,
4th, Lime,
5th, Shale (heavy)
6th, Oil sands (good producers, 1000 feet deep).

Well No. 7, 1000 feet east of No. 6, on slope of hill, start well in broken lime;

2nd, Conglomerate,
3rd, Shale,
4th, Lime,
5th, Shale (heavy),
6th, Sandstone (Artesian water flows over casings).

J. F. Milner.

The California Oil Field and the Alamogordo Field



The Head Of the New Bureau Of Mines

Dr. Joseph A. Holmes, appointed head of the new bureau of mines over the objections of secretary Ballinger, is a real conservationist. That may be why Ballinger opposed him. At any rate that is why he landed the job.

"While other men have been promoting conservation by the conversational process," says a student of his work in the October number of Hampton's magazine, "Dr. Holmes, as chief of the technologic branch of the geological survey, has been devising methods for doing such practical things as extracting the largest tonnage of coal from a given area of coal measures, and then producing from that coal the largest possible amount of heat and power. He has been teaching scientific mining, to save coal and to save human life. He has devised administrative machinery for accomplishing these purposes through governmental supervision, and has induced congress to create a bureau of mines.

"Dr. Holmes studied mining methods in France, Belgium, Germany, England—wherever there was a thorough understanding of proper mining and of protecting the miner. He found that we were killing three times as many men out of each thousand working underground as were European countries.

Flaws In American Methods.

"Dr. Holmes set himself to find the flaws in American methods. When such disasters occurred as those at Mononga, at the Darr mine, at Palos in Alabama, and at the Cherry mine in Illinois, he hurried to the spot, donned an oxygen helmet which he had borrowed from Germany, and went below. Where noxious gases had snuffed out the lives of the miners he penetrated. His organized rescuers, with the safety equipment of the European miners, saved many lives. Holmes hung doggedly to the trail of the cause of the disaster. He set other strong and daring young men on the same trail, and soon was announcing scientific discoveries about the causes of disasters, such as even the experts of Europe had sought in vain.

"The discovery of the explosiveness of coal dust is typical. The mining world had always attributed mine explosions to gases. Dr. Holmes noted that these explosions usually occurred in cold weather. It was found that mines were dryer in the cold season, because the cold air which was pumped into the mine became heated, absorbed the moisture and on leaving the pit carried it out. Analysis of the air entering and leaving a certain mine showed that this current was taking out 60 tons of moisture a day. In such conditions a mine became as dry as a bone and filled with dust.

Coal Dust Explosive.

"Then arose the question whether coal dust is explosive. The technologic branch had an explosives chamber at Pittsburg for testing just such things. It was filled with coal dust and this was exploded over and over again!

"Dr. Holmes organized a life saving squad with headquarters at Pittsburg, the duty of which was to rush to disasters, go below, save lives, and, above all, demonstrate the possibilities of life saving devices.

"The value of the work is demonstrated by the falling death rate since Dr. Holmes's work began to attract attention. In 1907 one man was killed for every 145,000 tons of coal mined; in 1908 one for every 167,000 tons; in 1909 one for each 186,000 tons. And people who know, credit this improved condition largely to the Holmes propaganda.

"The saving of life is only one purpose of the Holmes program. Only second in importance is the effort to teach operators to get the maximum tonnage from their mines, to save materials in propping roofs, and to leave an exhausted mine in such condition that it will involve the least menace to surface property.

Conservation Problem.

"In the field of metal mining the problem of conservation is to get all the value out of the ores. In gold and silver mining many millions of dollars have gone over the dump from incomplete mining. Great bodies of low grade ore have been beyond development because of the expense of known methods. Dr. Holmes's effort has been to amass all information upon these subjects, and put it at the disposal of the big and little operator alike.

"To develop boilers, grates and apparatus for steam power plants, of such scientific construction as to assure the maximum energy from every pound of coal, has been one of the efforts of Dr. Holmes.

"Small wonder that so practical a service should have grown rapidly. The demand for the creation of a bureau of mines, to take over and expand all these activities finally attained such force that congress at the last session, passed the law. Dr. Holmes, whose work made the bureau inevitable, is naturally the man to be its chief and it is gratifying that president Taft has named him as dfrector, because it is well understood that strong pressure was used to prevent the appointment.

"The public indorsement of Dr. Holmes for the directorship was almost unanimous. It came from mine operators and miners' organizations as well. That is, it was the strongest of all indorsements, one of his efficiency from the class of men who had benefited frequently by his efforts."

MANY FOREIGN MINING COMPANIES DEVELOPING ALL CHIHUAHUA FIELDS

Industry in the Northern State of the Mexican Republic Has Been Revivified Since the Famous Panic of 1907—Some of the Work Going on There and Companies Operating.

The financial crisis of 1907 seriously curtailed mining operations in the state of Chihuahua as it did most everywhere else, but since that time the business has been slowly recovering from that reverse. There are fewer companies operating in the state than previous to 1907, but they are stronger financially and it is a safe assertion that there is not a fake or "wild-cat" being exploited in the entire state at the present time.

Powerful New Companies.

Some powerful new corporations have entered the state since 1907, notably The Exploration Company of England and Mexico and the Sierra Consolidated mines company. The former is a strong English concern of which R. M. Raymond, the well known mining engineer, is the representative in Mexico, and the latter is composed principally of Duluth capitalists, headed by Thos. F. Cole and Jos. B. Cotton. Notable in this connection is the entrance of English capital into the Chihuahua field as in other parts of Mexico; also, the appearance of two powerful aggregations of Canadian-English capital, one taking over Chihuahua railroads and vast lumber interests, and the other establishing the great hydro-electric power enterprise, all of which enterprises are having, and will have, an important effect on mining.

New Lead Smeltler.

During the past three years the American Smelting and Refining company has built a lead smelter just outside the city of Chihuahua; has four furnaces in operation and will soon have its fifth one, bringing the aggregate capacity up to 750 tons daily.

At Terazas, 25 miles north of the city of Chihuahua, on the National railways, the Rio Tinto Copper company, controlled by Corrigan & McKinzey, of Cleveland, O., has its 600-ton copper smelter, with a converter plant about ready for operation, and has proved its copper mines there to have immense deposits of ore.

The Cia. Minera de Naica, which owns and operates the great San Pedro mine in the Naica district, is setting aside 200,000 pesos monthly from its profits to build a million peso lead smelter at Conches station to treat its own ores and to do custom work as well.

Parral is Waking Up.

Parral, the district famed for its vast bodies of low grade silicious silver ores, is awakening from the lethargy which settled down upon it after the smelters found, about six years ago, other sources of silicious ores and will have by the close of this year two large cyanide mills in operation and both of them doing custom work. It has long been realized that the cyanide process was and is the proper one to treat profitably most of the Parral ores. The Parral Milling company will have its first unit of 333 tons daily capacity of its 1000-ton plant in operation in October. The Veta Colorado Mining and Smelting company is pushing the work on its 300-ton mill and cyanide plant at Minas Nuevas and will have it in operation before the end of the year. The now absolute certainty of the early completion of these mills is encouraging the miners greatly, for they now see a chance to get their ores treated at a profit.

New Mine Railroad.

The San Francisco del Ora Mines Ltd., an English concern, is building a 7-kilometer line of railroad from the Parral and Durango railroad to its mines, is grading the site for its 300-ton reduction plant and the machinery for the plant will soon be arriving from England.

In the district of Mina, in extreme southern Chihuahua, the West Mexico Mines company, an English concern, recently took hold of the old Rosario silver-gold mine at Guadalupe y Calvo and is ordering from England the machinery for a 200-ton mill and cyanide plant, to be erected as rapidly as possible. The Rosario is one of the famous antigua mines of Mexico, but it is claimed that it still has vast bodies of ore which will run $10 in gold values to the ton.

French Capital at Almoloya.

In the Almoloya camp, about five miles from the Parral branch of the National railways, it is said that a powerful French company is negotiating for the purchase of the great Cigarrera silver-lead-copper mine, and a large number of other properties there, for 12,000,000 pesos. This company is reported to have purchased mining properties to the amount of 5,500,000 pesos in the state of Nuevo Leon.

Naica a Mexican Camp.

The Naica district, less than 20 miles from Conchos station, on the National railways, is noted as being the Mexican camp of Chihuahua; that is, of the several companies there which are all now proved successes, they are controlled by Mexicans; the Naica Mining company is the only American concern. The ores are silver-lead, and in vast uantities. The principal mines are the San Pedro, owned by the Cia. Mines de Naica, and the Lepanto, both big producers. The San Pedro has the distinction of having produced in the lest seven years 190,420 tons of ore, marketed at the smelter for 6,447,571.53 pesos, and paid 3,262,800 pesos in 237 dividends during that time. The company owns its own narrow gage railroad from Conchos to its mines and is accumulating a fund to build its own smelter.

So far, not a failure is reported having been made where anything like extensive work has been done on properties in the Naica mountain, and this camp has come into prominence in the last seven years.

Progress at Santa Eulalia.

The famous old Sta. Eulalia district, 15 miles from the city of Chihuahua, is going right ahead and continues to be the principal source of supply of silver-lead fluxing ores for the local smelter, besides shipping large amounts to the Torreon and El Paso smelters.

Since March last the Exploration Company of England and Mexico bought for cash, said to have been $600,000 U. S. currency, the producing properties of the Sta. Eulalia Exploration company, controlled by San Francisco, California, people.

The other principal producing concerns of Sta. Eulalia are the Potosi Mining company, the Chihuahua Mining company, The American Smelting and Refining company, and the San Toy Mining company. The last mentioned concern, headed by Chas. M. Schwab, entered the camp about four years ago and bought, among other properties, the Juarez and Central mines, then unproved. According to reliable reports the systematic development work since is proving up on those two mines vast bodies of ore which promise to rival, if not surpass, those of the Potosi mine of the Potosi Mining company mentioned, probably the greatest mine of its class in the world.

San Toy Equipment.

The San Toy company has the most perfect equipment of any concern in the state, owns an aerial tramway over four miles long to the foot of the mountain, and its own railroad of about the same length from the lower end of the tramway to the National railways. The company does not owe a dollar, has a large surplus, is continuing its big development and is shipping to the smelters 100 to 200 tons of good grade ore daily.

In the San Pedro, Sabinal and Elcondido mining camps, in the extreme northern part of the state, mining operations have been increased during the past year or more. A number of American companies are developing properties, and others soon will be on a shipping basis.

The great mining properties of the Candelaria Mining company have been shipping to the El Paso smelter. The company is building a three-mile spur railroad from the Mexico North-Western railway at San Pedro to its Leon mine. At enormous expense the company has installed immense pumping machinery, said to throw more water than any other in the world.

Greene Properties Paying.

Less than a year ago the Sierra Consolidated Mines company entered the Ocampo district, after taking over numerous gold-silver properties which had been segregated from W. C. Greene's ill-fated Greene Gold-Silver company, which had previously totally collapsed. Under the general management of R. M. Atwater, jr., and the superintendency of Robt. Linton, of Los Angeles, systematic mining is going on to prove the good grade true fissure veins which had yielded $100,000,000 worth of gold and silver from the shallow surface workings after 32 1-3 percent of the values were lost in treatment. The company is well pleased with the work thus far and the great old camp of Ocampo, or Jesus Maria, is sure to be again a big producer to the Sierra company.

At Yoquivo, the Yoquivo Development company has met with wonderful success in its gold properties which it has developed. A number of car loads of ore have brought $20,000 to $40,000 Mexican currency per car. A 100-ton mill and cyanide plant has been built by the company.

At the Concheno gold-silver mines Corrigan, McKinney & company, of Cleveland, Ohio, who also own the Rio Tinto copper mines and smelter at Terrazas, have been carrying on systematic development since the collapsed Greene Gold-Silver company lost them after paying near $1,000,000 gold on the purchase price.

Chinipas District Mines.

In the Chinipas district the old Palmarejo and Mexican Gold Fields, Ltd., after 25 years of English stubborn stick-to-ativeness, with practically no dividends, and spending over $5,000,000 gold, has got in a new English company with new money which has been doing development and is preparing to erect a new mill.

The building of the Southern Pacific of Mexico to Alamos, Sonora, is attracting considerable attention to the rich gold-silver district about Chinipas.

Rio Plata Prosperous.

The Rio Plata Mining company, which owns and operates the rich Santa Barbara mine, near Guazapares, with its 25-stamp mill and cyanide plant operated by water power, with a supplementary steam plant, is a clean cut mining proposition with a regular monthly output (that of July was 82,000 ounces), and for a year now has been paying 2 percent quarterly dividend—and this after the mine has paid out $325,000 gold of its purchase and the company does not owe a dollar. D. W. Shanks, of Los Angeles, is general manager.

The famous Batopilas silver mines are regular producers of bullion from the Batopilas Mining company, which was organized by the late Gov. Alexander R. Shepherd. This company is to get English capital in with it to increase operations, and to work other properties of its vast holdings. Good gold veins have just been reported discovered.

The Lluvia de Oro.

Something can now be expected from the rich Lluvia de Oro gold mines, near Batopilas, as Geo. A. Schroeter is the consulting engineer and in full charge of the management. Never, perhaps, in the history of mining was a mine rich in gold from the grass roots more grossly and inexcusably mismanaged for several years as was the Lluvia de Oro.

The Cabacillas mine (strictly gold), not far from the Lluvia de Oro, is proving a good success and a new 100-ton mill is to be built.

Famous Dolores Mines.

But of all mines of the state of Chihuahua the greatest are those of the Dolores Mines company, at Dolores, in the Sierra Madres, 1½ days' ride from Madera. This company is paying 18 per cent per annum on a capitalization of $2,000,000 gold. This mine has the remarkable record of having paid for its first mile of development work out of shipping ore with practically no stoping, and that ore had to be packed on mule back a 10 days' trip to the railroad. The company has a fine mill and cyanide plant. Geo. A. Schroeter is consulting engineer and W. St. Paul manager of this company.

Right here at Dolores is one of the curious and paradoxical conditions not so very uncommon in Mexico. With this remarkable record of the Dolores mines and with capable mining men admitting the district had an exceptional showing in many other veins, there is not another company operating in that section. Only recently have mining men begun to pay attention to the district and it is now highly probable that one or more strong companies will take hold of properties in the Dolores district.

A New Combination.

The Dolores Mines company and El Rayo Mines company, the latter owning El Rayo and other producing gold-silver mines near Sta. Barbara, Chih., are with the Creston Colorado and La Dura mines in Sonora being merged into the new Mines Company of America, with a capitalization of $9,000,000 gold. El Rayo is another clean-cut dividend payer, paying at the rate of 12 percent annually. Geo. A. Schroeter is consulting engineer of El Rayo company, also.

Famous Indian Camp.

An old and long neglected silver camp which was a big producer in antigua days, is that of Cushuiriachic, only 13 miles from the Mexico North-Western railroad, which runs westward from the city of Chihuahua. It is beginning to attract attention now because the company which owns that railroad has thought enough of it to commence building a 24-kilometer railroad into it and will have the line finished in five or six months.

Another thing that has opened the eyes of mining men to latent possibilities of the district, is the remarkable success of the Cusi Mining company, of which Potter Palmer, jr., of Chicago, is the head, and M. F. Crosette manager. In 1909 this company took over the Promontorio mine, then only a very promising prospect, and in less than a year had the mine, equipment and development paid for and the company has been on velvet ever since, shipping from one to three cars of ore every month, which brings 15,000 pesos, or more, per car, not to mention several cars of other ore of excellent grade. Several English companies, represented by L. Maurice Cockerell of Chihuahua, are developing a number of properties in the Cushuiriachic district.

Guaynopa District.

This Canadian-English company, the Mexico North-Western Railway company, is also causing considerable attention to be shown to the Guaynopa district and its antigua mines. This company is building a 116-mile line of railroad from Terrazas, Chih., on its El Paso division, to Madera, on its Chihuahua division. This will run within 35 miles of the Guaynopa district, with its great veins carrying silver, copper and gold. Already development work has been started on a number of properties in this district. This railroad company's lumber enterprise, the Madera company, Ltd., at Madera, has great saw mills where 400,000 feet of lumber is being turned out every 24 hours, and is of no inconsiderable importance to mining in Chihuahua and northern Mexico.

ADDITIONAL MINING AND OIL NEWS ON PAGE 27.